

WHAT IS CLAIMED IS:

1. A system for identifying a signal source in a predetermined space, comprising:
 - a plurality of sensing units arranged at different locations of the predetermined space to detect signals in the predetermined space;
 - at least one recording unit connected to the sensing units and arranged to separately and simultaneously record a detected signal at each of the sensing units that detects the signal; and
 - a processing unit configured to receive signal recordings from the at least one recording unit and including:
 - a first storage area configured to store a set of identified signatures corresponding to a plurality of signal sources in the predetermined space,
 - a second storage area configured to store parameters related to the conditions under which the recordings of the signal are made, and
 - an identifying unit programmed to:
 - determine a spectrum of the recorded signal,
 - detect a line emerging from background noise of the spectrum by using a predetermined emergence threshold,
 - compare the line with some or all of the signatures included in the set of identified signatures,
 - select at least one signature corresponding to the line to create at least one signature/line pair, and
 - identify a source of the signal based on the created at least one signature/line pair.
2. The system of Claim 1, wherein each sensing unit is arranged as one of an accelerometer and a microphone.
3. The system of Claim 1, wherein the predetermined space includes at least one of an interior space of a transportation vehicle and components of the transportation vehicle.

4. The system of Claim 3, wherein the processing unit includes an electrical power supply independent of an electrical power supply network of the vehicle.

5. The system of Claim 3, wherein,
the vehicle is an aircraft, and
the plurality of sensing units is positioned in at least one of the cabin and cockpit of the aircraft.

6. The system of Claim 3, wherein the plurality of sensing units is permanently attached to components of the vehicle.

7. A system for identifying a signal source in a predetermined space, comprising:
means for storing a set of identified signatures corresponding to a plurality of signal sources;

means for recording a signal simultaneously at different locations of the predetermined space;

means for storing parameters related to the conditions under which the recordings of the signal are made;

means for determining a spectrum of the signal;

means for detecting a line emerging from background noise of the spectrum by using a predetermined emergence threshold;

means for comparing the line with some or all of the signatures included in the set of identified signatures;

means for selecting at least one signature corresponding to the line to create at least one signature/line pair; and

means for identifying a source of the signal based on the selecting step.

8. The system of Claim 7, further comprising means for consolidating a signature/line pair when the selecting means results creates only one signature/line pair, the consolidating means including:

means for modifying a measurement parameter,

means for comparing a recording corresponding to the modified parameter with the recording of the detected signal,

means for retaining the signature for the line if the signal is modified as predicted in the signature retained by modifying the parameter, and

quantifying the source corresponding to the line if the signal is not modified as predicted in the signature retained by modifying the parameter.

9. The system of Claim 7, further comprising means for resolving a signature/line pair ambiguity when the selecting step results in two or more signature/line pairs, the resolving means including:

means for modifying a measuring parameter,

means for comparing a recording corresponding to the modified parameter with the recording of the detected signal;

means for analyzing the modification of the signal,

means for searching for signature/line pairs verifying a modification conforming to the observed modification,

means for retaining a signature for the line if only one signature/line pair verifies the observed modification,

means for restarting an ambiguity resolving process by modifying another parameter if a plurality of signature/line pairs verifies the modification, and

means for quantifying the source corresponding to the line if no signature/line pair verifies the modification.

10. The system of Claim 7, further comprising means for quantifying a source when the selecting step results in no signature/line pair, the quantifying means including:

means for comparing the line with a greater number of signatures if the comparing step applied to only some of the signatures included in the set of identified signatures,

means for carrying out a consolidation process or an ambiguity resolving process if a signature is then found and depending on the number of signatures found, and

means for carrying out additional measurements with different parameters if a signature is not found.

11. The system of Claim 7, wherein the inventoried signatures include information related to:

the range of frequencies of the signal emitted by each corresponding source,

the conditions under which the signal emitted by each corresponding source is present, and

the effects of modifying one or more parameters on the signal emitted by each source.

12. The system of Claim 7, wherein the determining means processes the recorded signal by a fast Fourier transform to obtain a single spectrum by weighting and averaging.

13. The system of Claim 7, wherein the determining means determines the spectrum of the signal by generating a non-weighted spectrum and applying a picket fence effect correction prior to weighting.

14. The system of Claim 7, wherein the determining means applies a power density spectrum correction to emergent lines of the spectrum.